

Table 3 (Cont'd)

Brand	ORNL/FTC Number	Description	Deliveries, (mg) Per Puff		
			Tar mg	Nicotine mg	CO mg
<i>Swist</i>	157	extra long (100 mm), soft pack, filter, lemon/menthol	1.40	0.0971	1.63
<i>Vantage</i>	158	king size (85 mm), soft pack, filter	1.4	0.099	2.0
<i>Vantage</i>	159	king size (85 mm), soft pack, filter, menthol	1.3	0.098	2.0
<i>Vantage</i>	160	extra long (100 mm), soft pack, filter	1.34	0.81	1.72
<i>Viceroy</i>	161	king size (85 mm), soft pack, filter	1.8	0.13	2.3
<i>Viceroy Rich Lights</i>	162	king size (85 mm), soft pack, filter	1.7	0.12	1.9
<i>Viceroy</i>	163	extra long (100 mm), soft pack, filter	1.62	0.109	1.84
<i>Virginia Slims</i>	164	extra long (100 mm), soft pack, filter	2.1	0.099	2.0
<i>Winston</i>	166	king size (80 mm), hard pack, filter	2.00	0.120	1.51
<i>Winston</i>	167	king size (85 mm), soft pack, filter	2.2	0.17	2.1
<i>Winston Lights</i>	168	king size (85 mm), soft pack, filter	1.6	0.094	1.7
<i>Winston 100's</i>	169	extra long (100 mm), soft pack, filter	2.05	0.122	1.88
<i>Winston Lights 100's</i>	170	extra long (100 mm), soft pack, filter	1.5	0.10	1.7
<i>Winston</i>	171	extra long (100 mm), soft pack, filter, menthol	1.90	0.109	1.70

\*Two types of filters were found in samples of Raleigh Lights and Silva Thins. Some filters possessed air dilution holes, some did not. Samples of these brands were segregated according to filter type and smoked separately. See Text.

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Carbon Monoxide, Tar, and Nicotine Deliveries of 120 Brands of  
U.S. Commercial Cigarettes

12-28-78

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INTRODUCTION

In October, 1978, the Director, Office of Smoking and Health, DHEW, requested the Tobacco Smoke Research Program of Oak Ridge National Laboratory, as an extension of its NCI Smoking and Health Program activities, to provide values for carbon monoxide deliveries of the smokes of U.S. commercial cigarettes. One hundred twenty (120) brands were chosen by the Director as potential candidates for analysis. The brands were chosen to include both the most popular selling brands and those representative of low and high "tar" cigarettes. This report is a result of that request. "Tar" and nicotine deliveries were determined simultaneously and are reported here to permit future comparison with FTC results. Because of time constraints, this report consists mainly of a tabulation of the data which are a result of the requested analyses. Interpretation and assessment must await more careful evaluation of the data, and will be the subject of an ORNL Technical Memorandum. Also, smoke deliveries reported by ORNL are based on a much smaller sample of cigarettes than results reported by the FTC, and are not necessarily representative of all lots of a particular brand sold on a nationwide basis.

EXPERIMENTAL

Cigarettes. Samples of U.S. commercial cigarettes were obtained through Mr. Harold Pillsbury of the Federal Trade Commission. At least 30 cigarettes of each brand were made available to us. Two cigarette packs, from which five cigarettes each had been removed, were selected at random from the current supplies at the FTC cigarette storage facility and returned to ORNL on November 23, 1978. Cigarettes were stored frozen in double plastic bags until use. After thawing, bags were opened and the cigarettes were conditioned at least 48 hours at  $60 \pm 2\%$  relative humidity and  $74^\circ\text{F}$ . Because of the limited sample size, non-protocol cigarette selection procedures had to be employed. An attempt was made to select cigarettes for smoking which were representative of the apparent average weight of the sample. Resistance-to-draw of the selected cigarettes was also measured. All of the work reported in this document was performed between November 27 and December 22, 1978.

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Reference Cigarette. Analytical procedures were periodically tested by application to the smoke generated by the 1R1 Kentucky Reference Cigarette. During the period of analyses, seven separate generations representing 28 determinations from 112 individual 1R1 cigarettes were performed. The deliveries of specific smoke constituents by this cigarette have been measured and documented in previous work (1).

Smoking. Cigarettes were smoked, four to six per pad, through a standard Cambridge filter assembly (2) on a four port version of the Phipps and Bird Analytical Smoking Machine (Philip Morris design produced by Phipps and Bird, Inc., Richmond, VA) under standard smoking conditions (3) of  $35 \pm 0.2$  ml puff volume,  $2 \pm 0.2$  sec puff duration, and 1 puff/minute frequency to a specified butt length. For non-filter cigarettes, this was 23 mm. Filter cigarettes were smoked to within 3 mm of the filter overwrap. Usually four ports were smoked for each analysis.

Total Particulate Matter (TPM), Water, Nicotine, and "Tar". TPM was determined (4) to be the increase in weight of a Cambridge filter pad placed behind the cigarette butt end following the smoking procedure. The particulate matter was extracted with dioxane, and an aliquot of the extract was analyzed (5) for water content by gas-solid chromatography. Nicotine was determined (6) on a separate aliquot of the extract by gas-liquid chromatography. "Tar" was taken to be the weight of TPM less the weight of water and nicotine deliveries, per cigarette.

Carbon Monoxide (CO). During the analytical smoking procedure, the entire gas phase delivery of the cigarette was expelled into a Saran gas sampling bag. An aliquot of the contents of the bag was then analyzed for carbon monoxide by gas-solid chromatography (7). Because of the importance of the CO values in this work, carbon monoxide deliveries were determined by comparison with two standard gas mixtures, which had been analyzed by two independent laboratories.

Because they require no additional sample generation or analysis and very little additional data handling, cigarette carbon dioxide (CO<sub>2</sub>) deliveries were also determined. For the sake of clarity, they have not been included in this report. However, anyone interested in obtaining that data can do so by contacting the author.

## RESULTS

On Table 1, the average weight, resistance to draw, and number of puffs for the individual brands are tabulated. Generally, the "light" varieties of particular brand names have lower RTD's than the regular filter counterparts, primarily because of the presence of air dilution holes in the filter.

On Table 2, the carbon monoxide, "tar" and nicotine deliveries are tabulated on a per-cigarette basis. On Table 3, deliveries are presented on a per puff basis. It is important to note that these are averaged values, and do not necessarily represent the constituent delivery on any given puff. Usually, actual measured per puff deliveries increase from a lower value as the cigarette is consumed during smoking.

Correlation between carbon monoxide and tar deliveries follow an interesting trend. If, on a per-cigarette basis, an arbitrary break point of 13 mg "tar" is selected to separate low "tar" from high "tar" cigarettes, then the low "tar" cigarettes exhibit a high degree of correlation between CO and "tar" deliveries. That is, the correlation coefficient (R) for CO vs. "tar" delivery was determined to be 0.905. On the other hand, the smoke deliveries of the high "tar" cigarettes exhibited a correlation coefficient (R) of 0.359 for CO vs. "tar". This suggests that for low "tar" cigarettes, "tar" deliveries would be fairly good predictors of CO deliveries, whereas it would be very difficult to predict CO delivery from "tar" content of the smoke of a high "tar" cigarette. The above data is available in graphical form and will be discussed more extensively in the upcoming ORNL Technical Memorandum.

The use of air dilution holes in cigarette filters is becoming increasingly popular. The holes act to diminish smoke constituent deliveries primarily by reducing the effective puff volume through the cigarette firecone. In two samples obtained from the FTC, Raleigh Lights and Silva Thins (Codes 127 and 140, respectively), some cigarettes had air dilution holes in the filter, while others did not. Since these could potentially affect smoke deliveries, we elected to segregate the cigarettes into two groups and smoke them separately. We purchased an additional pack of Silva Thins locally, and found them to have air dilution holes. Interestingly, the locally purchased Silva Thins had an average RTD which was closer to that of the FTC sample without the holes. The nicotine deliveries of the two

samples followed this pattern (see Table 2), whereas the "tar" and CO deliveries of the two samples with air dilution holes were closer. For the Raleigh Lights, the CO delivery of the sample without the holes was greater than that for those with the holes.

Nicotine is determined via gas chromatographic methods at ORNL, whereas FTC reported values are based on the determination of nicotine as total alkaloids via a Griffith steam distillation-colorimetric procedure. For reference or experimental cigarettes, the results are usually quite comparable. A comparison of our nicotine values for the commercial cigarette smokes with those most recently reported by the FTC (8) yielded a correlation coefficient ( $R$ ) of 0.949. We consider this correlation quite good considering: (1) the small sample size upon which the ORNL data is based and (2) the fact that the FTC reports its nicotine values to only the nearest 0.1 mg. One marked exception to this good correlation was the nicotine delivery of the Players cigarettes. We determined the nicotine delivery to be  $\sim 1.8$  mg per cigarette, whereas the FTC reported a delivery of 2.5 mg in May of 1978. As a check, we purchased a package of Players locally, and determined the nicotine delivery of those cigarettes to be 1.65 mg per cigarette. We suspect that Philip Morris, maker of the Players brand, may have changed its tobacco blend since the time that the FTC last analyzed that cigarette.

## References

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Table 1

Brand Description and Physical Characteristics  
of Selected U.S. Commercial Cigarettes

Brand	Description	ORNL/FTC Number	Cigarette Wt., mg	Cigarette Resistance to Draw mm H <sub>2</sub> O	Number of Puff
<i>Belair</i>	king size (85 mm), soft pack, filter, menthol	4	982	105	8.0
<i>Belair</i>	extra long (100 mm), soft pack, filter, menthol	5	1166	117	10.2
<i>Benson &amp; Hedges</i>	regular size (70 mm), hard pack, filter	6	966	76	7.1
<i>Benson &amp; Hedges 100's</i>	extra long (100 mm), hard pack, filter	8	1102	132	8.9
<i>Benson &amp; Hedges 100's</i>	extra long (100 mm), hard pack, filter, menthol	9	1114	121	9.1
<i>Benson &amp; Hedges 100's</i>	extra long (100 mm), soft pack, filter	10	1078	115	8.4
<i>Benson &amp; Hedges Lights</i>	extra long (100 mm), soft pack, filter	12	1126	109	9.4
<i>Benson &amp; Hedges Lights</i>	extra long (100 mm), soft pack, filter, menthol	13	1139	113	9.1
<i>Bull Durham</i>	king size (85 mm), soft pack, filter	14	1180	83	11.5
<i>Camel</i>	regular size (70 mm), soft pack, non-filter	15	910	75	7.6
<i>Camel</i>	king size (85 mm), soft pack, filter	16	975	130	8.6
<i>Camel Lights</i>	king size (85 mm), soft pack, filter	17	958	118	8.3
<i>Carlton</i>	king size (85 mm), soft pack, filter	19	788	115	7.1
<i>Carlton</i>	king size (85 mm), soft pack, filter, menthol	20	779	110	6.9
<i>Carlton 100's</i>	extra long (100 mm), soft pack, filter, menthol	22	929	98	9.2
<i>Chesterfield</i>	regular size (70 mm), soft pack, non-filter	23	898	75	7.8
<i>Chesterfield</i>	king size (85 mm), soft pack, non-filter	24	1050	87	9.6
<i>Chesterfield</i>	king size (85 mm), soft pack, filter	25	941	107	8.2
<i>Chesterfield</i>	extra long (101 mm), soft pack, filter	26	1118	142	9.2
<i>Decade</i>	king size (85 mm), soft pack, filter, menthol	28	891	76	8.3
<i>Doral</i>	king size (85 mm), soft pack, filter	31	1128	83	9.4
<i>Doral</i>	king size (85 mm), soft pack, filter, menthol	32	1098	84	8.5
<i>DuMaurier</i>	king size (85 mm), hard pack, filter	33	1032	122	8.8
<i>English Ovals</i>	king size (85 mm), hard pack, non-filter	35	1105	77	9.9

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Table 1 (Cont'd)

Brand	Description	ORNL/FTC Number	Cigarette Wt., mg	Cigarette Resistance to Draw mm H <sub>2</sub> O	Number of Puffs
<i>Eve</i>	extra long (100 mm), soft pack, filter	36	1056	113	8.5
<i>Eve</i>	extra long (100 mm), soft pack, filter, menthol	37	1082	116	8.9
<i>Iceberg 100's</i>	extra long (100 mm), soft pack, filter, menthol	46	950	122	8.6
<i>Kent</i>	king size (80 mm), hard pack, filter	47	946	130	7.9
<i>Kent Golden Lights</i>	king size (85 mm), soft pack, filter	49	920	104	7.4
<i>Kent Golden Lights</i>	king size (85 mm), soft pack, filter, menthol	50	934	92	8.6
<i>Kent Micronite II</i>	extra long (100 mm), soft pack, filter	51	1077	100	9.4
<i>Kent Golden Lights</i>	extra long (100 mm), soft pack, filter	52	1047	120	8.5
<i>Kent</i>	extra long (100 mm), soft pack, filter, menthol	53	1055	106	8.5
<i>Kent Golden Lights</i>	extra long (100 mm), soft pack, filter, menthol	54	1170	112	9.2
<i>Kool</i>	king size (80 mm), hard pack, filter, menthol	56	947	111	8.1
<i>Kool Milds</i>	king size (85 mm), soft pack, filter, menthol	58	985	118	8.0
<i>Kool Super Lights</i>	king size (85 mm), soft pack, filter, menthol	59	1008	102	8.5
<i>Kool</i>	extra long (100 mm), soft pack, filter, menthol	60	1151	134	10.5
<i>Kool Super Lights</i>	extra long (100 mm), soft pack, filter, menthol	61	1206	120	9.8
<i>L&amp;M</i>	king size (80 mm), hard pack, filter	62	905	121	8.1
<i>L&amp;M</i>	king size (85 mm), soft pack, filter	63	951	123	7.9
<i>L&amp;M Lights</i>	king size (85 mm), soft pack, filter	64	882	92	8.4
<i>L&amp;M Lights</i>	extra long (100 mm), soft pack, filter	66	1030	94	9.0
<i>L&amp;M</i>	extra long (100 mm), soft pack, filter, menthol	67	1102	129	9.8
<i>Lark</i>	king size (85 mm), soft pack, filter	68	1112	132	9.0
<i>Lark II</i>	king size (85 mm), soft pack, filter	69	844	90	7.4
<i>Lark</i>	extra long (100 mm), soft pack, filter	70	1123	119	9.6
<i>Lucky Strike</i>	regular size (70 mm), soft pack, non-filter	73	958	71	8.0
<i>Lucky Ten</i>	king size (85 mm), soft pack, filter	74	979	139	8.0
<i>Marlboro</i>	king size (80 mm), hard pack, filter	78	946	108	8.2
<i>Marlboro</i>	king size (80 mm), hard pack, filter, menthol	79	931	113	8.0
<i>Marlboro</i>	king size (85 mm), soft pack, filter	80	1002	131	8.6
<i>Marlboro Lights</i>	king size (85 mm), soft pack, filter	81	1121	89	8.0
<i>Marlboro</i>	extra long (100 mm), hard pack, filter	83	1108	126	9.2
<i>Marlboro</i>	extra long (100 mm), soft pack, filter	84	1126	116	9.8
<i>Marlboro Lights</i>	extra long (100 mm), soft pack, filter	85	1155	128	9.9

Table 1 (Cont'd)

Brand	Description	ORNL/FTC Number	Cigarette Wt., mg	Cigarette Resistance to Draw mm H <sub>2</sub> O	Number of Puf
Max	extra long (120 mm), soft pack, filter	86	1020	151	10.7
Max	extra long (120 mm), soft pack, filter, menthol	87	1019	151	11.1
Merit	king size (85 mm), soft pack, filter	88	1002	136	8.3
Merit	king size (85 mm), soft pack, filter, menthol	89	1010	136	8.1
Merit 100's	extra long (100 mm), soft pack, filter	90	1216	130	10.0
Merit 100's	extra long (100 mm), soft pack, filter, menthol	91	1151	112	9.1
More	extra long (120 mm), soft pack, filter	93	1038	187	15.6
More	extra long (120 mm), soft pack, filter, menthol	94	1097	176	16.3
Multifilter	king size (85 mm), soft pack, filter	95	1149	76	7.6
Newport	king size (80 mm), hard pack, filter, menthol	97	923	132	8.2
Newport Lights	king size (85 mm), soft pack, filter, menthol	99	925	119	8.6
Newport	extra long (100 mm), soft pack, filter, menthol	100	1068	122	9.7
Now	king size (85 mm), hard pack, filter	101	792	108	7.4
Now	king size (85 mm), hard pack, filter, menthol	102	800	115	7.1
Now	king size (85 mm), soft pack, filter	103	810	108	7.8
Old Gold Filters	king size (85 mm), soft pack, filter	107	949	126	7.6
Old Gold Lights	king size (85 mm), soft pack, filter	108	920	117	8.6
Old Gold 100's	extra long (100 mm), soft pack, filter	109	1140	120	9.6
Pall Mall	king size (85 mm), soft pack, non-filter	110	1125	71	10.3
Pall Mall Extra Light	king size (85 mm), soft pack, filter	112	991	107	8.8
Pall Mall	extra long (100 mm), soft pack, filter	113	1159	111	10.1
Parliament	king size (80 mm), hard pack, filter	115	970	123	7.3
Parliament	king size (85 mm), soft pack, filter	116	1004	123	7.7
Parliament 100's	extra long (100 mm), soft pack, filter	117	1328	154	10.0
Philip Morris	regular size (70 mm), soft pack, non-filter	118	861	54	7.2
Philip Morris Commander	king size (85 mm), soft pack, non-filter	119	1030	61	9.3
Picayne	regular size (70 mm), soft pack, non-filter	122	862	85	7.1

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Table 1 (Cont'd)

Brand	Description	ORNL/FTC Number	Cigarette Wt., mg	Cigarette Resistance to Draw mm H <sub>2</sub> O	Number of Puff
<i>Players</i>	regular size (70 mm), hard pack, non-filter	124	1032	71	8.0
<i>Raleigh</i>	king size (85 mm), soft pack, non-filter	125	1137	85	9.8
<i>Raleigh</i>	king size (85 mm), soft pack, filter	126	1030	128	8.6
<i>Raleigh Lights*-FTC</i>	king size (85 mm), soft pack, filter, w/air dilution holes	127	1033	129	8.3
<i>Raleigh Lights*-FTC</i>	king size (85 mm), soft pack, filter, w/o air dilution holes	127	1010	110	8.4
<i>Raleigh</i>	extra long (100 mm), soft pack, filter	128	1198	146	9.9
<i>Real</i>	king size (85 mm), soft pack, filter	129	927	105	8.0
<i>Real</i>	king size (85 mm), soft pack, filter, menthol	130	964	103	8.0
<i>Salem</i>	king size (80 mm), hard pack, filter, menthol	133	903	137	9.0
<i>Salem</i>	king size (85 mm), soft pack, filter, menthol	134	1000	126	8.9
<i>Salem Lights</i>	king size (85 mm), soft pack, filter, menthol	135	990	123	8.4
<i>Salem</i>	extra long (100 mm), soft pack, filter, menthol	136	1164	122	10.2
<i>Salem Long Lights</i>	extra long (100 mm), soft pack, filter, menthol	137	1212	122	11.0
<i>Saratoga</i>	extra long (120 mm), hard pack, filter	138	1080	176	11.8
<i>Saratoga</i>	extra long (120 mm), hard pack, filter, menthol	139	1110	155	11.2
<i>Silva Thins*-FTC</i>	extra long (120 mm), soft pack, filter, w/air dilution holes	140	914	100	9.2
<i>Silva Thins*-Knoxville, TN</i>	extra long (120 mm), soft pack, filter, w/air dilution holes	140	942	114	9.0
<i>Silva Thins*-FTC</i>	extra long (120 mm), soft pack, filter, w/o air dilution holes	140	910	119	8.9
<i>Spring 100's</i>	extra long (100 mm), soft pack, filter, menthol	142	1125	111	9.1
<i>Tareyton</i>	king size (85 mm), soft pack, filter	147	1094	107	9.2
<i>Tareyton Lights</i>	king size (85 mm), soft pack, filter	148	1105	99	8.8
<i>Tareyton Low-Tar</i>	king size (85 mm), soft pack, filter, menthol	149	1017	103	8.1
<i>Tareyton Long Lights</i>	extra long (100 mm), soft pack, filter	151	1174	124	10.0
<i>True Blue 5's</i>	king size (85 mm), soft pack, filter	153	851	75	6.9
<i>True Green 5's</i>	king size (85 mm), soft pack, filter, menthol	154	848	73	7.5
<i>True 100's</i>	extra long (100 mm), soft pack, filter	155	1050	140	10.9
<i>True 100's</i>	extra long (100 mm), soft pack, filter, menthol	156	1095	115	9.8

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Table 1 (Cont'd)

Brand	Description	ORNL/FTC Number	Cigarette Wt., mg	Cigarette Resistance to Draw mm H <sub>2</sub> O	Number of Puffs
<i>Twist</i>	extra long (100 mm), soft pack, filter, lemon/menthol	157	1134	126	10.4
<i>Vantage</i>	king size (85 mm), soft pack, filter	158	1197	129	7.6
<i>Vantage</i>	king size (85 mm), soft pack, filter, menthol	159	1135	128	8.3
<i>Vantage</i>	extra long (100 mm), soft pack, filter	160	1262	114	10.0
<i>Viceroy</i>	king size (85 mm), soft pack, filter	161	1014	122	8.5
<i>Viceroy Rich Lights</i>	king size (85 mm), soft pack, filter	162	1024	105	8.4
<i>Viceroy</i>	extra long (100 mm), soft pack, filter	163	1217	121	10.1
<i>Virginia Slims</i>	extra long (100 mm), soft pack, filter	164	966	130	8.3
<i>Winston</i>	king size (80 mm), hard pack, filter	166	1012	124	10.0
<i>Winston</i>	king size (85 mm), soft pack, filter	167	1115	112	9.3
<i>Winston Lights</i>	king size (85 mm), soft pack, filter	168	986	105	8.7
<i>Winston 100's</i>	extra long (100 mm), soft pack, filter	169	1046	116	10.1
<i>Winston Lights 100's</i>	extra long (100 mm), soft pack, filter	170	1133	109	9.9
<i>Winston</i>	extra long (100 mm), soft pack, filter, menthol	171	1174	132	10.4

\*Two types of filters were found in samples of Raleigh Lights and Silva Thins. Some filters possessed air dilution holes, some did not. Samples of these brands were segregated according to filter type and smoked separately. See Text.

Table 2

Tar, Nicotine, and Carbon Monoxide Deliveries  
of Selected U.S. Commercial Cigarettes  
RESULTS PER CIGARETTE

Brand	ORNL/FTC Number	Description	Deliveries, Mean (mg) $\pm$ Standard Deviation (mg)		
			Tar mg	Nicotine mg	CO mg
Belair	4	ks (85 mm), sp, f, m	13.6 $\pm$ 0.5	0.98 $\pm$ 0.04	16.6 $\pm$ 0.1
Belair	5	el (100 mm), sp, f, m	15.6 $\pm$ 0.7	0.97 $\pm$ 0.03	17.0 $\pm$ 0.6
Benson & Hedges	6	rs (70 mm), hp, f	1.1 $\pm$ 0.1	0.11 $\pm$ 0.01	1.2 $\pm$ 0.1
Benson & Hedges 100's	8	el (100 mm), hp, f	18.3 $\pm$ 0.3	0.99 $\pm$ 0.03	21.9 $\pm$ 0.4
Benson & Hedges 100's	9	el (100 mm), hp, f, m	17.3 $\pm$ 0.8	1.03 $\pm$ 0.05	19.0 $\pm$ 1.4
Benson & Hedges 100's	10	el (100 mm), sp, f	17.3 $\pm$ 0.8	0.98 $\pm$ 0.03	18.4 $\pm$ 0.6
Benson & Hedges Lights	12	el (100 mm), sp, f	11.7 $\pm$ 0.5	0.74 $\pm$ 0.02	11.8 $\pm$ 0.4
Benson & Hedges Lights	13	el (100 mm), sp, f, m	11.5 $\pm$ 0.1	0.73 $\pm$ 0.02	8.4 $\pm$ 0.2
Full Durham	14	ks (85 mm), sp, f	35.5 $\pm$ 0.6	1.97 $\pm$ 0.08	28.6 $\pm$ 0.5
Camel	15	rs (70 mm), sp, nf	28.0 $\pm$ 2.0	1.69 $\pm$ 0.05	17.8 $\pm$ 0.2
Camel	16	ks (85 mm), sp, f	22.0 $\pm$ 0.6	1.26 $\pm$ 0.03	19.7 $\pm$ 0.8
Camel Lights	17	ks (85 mm), sp, f	10.2 $\pm$ 0.1	0.84 $\pm$ 0.01	13.1 $\pm$ 0.2
Carlton	19	ks (85 mm), sp, f	1.0 $\pm$ 0.2	0.12 $\pm$ 0.01	2.1 $\pm$ 0.2
Carlton	20	ks (85 mm), sp, f, m	0.5 $\pm$ 0.1	0.07 $\pm$ 0.01	1.1 $\pm$ 0.1
Carlton 100's	22	el (100 mm), sp, f, m	4.4 $\pm$ 0.4	0.40 $\pm$ 0.01	5.2 $\pm$ 0.3
Chesterfield	23	rs (70 mm), sp, nf	24.0 $\pm$ 1.1	1.31 $\pm$ 0.11	14.7 $\pm$ 0.5
Chesterfield	24	ks (85 mm), sp, nf	30.2 $\pm$ 1.2	1.29 $\pm$ 0.04	17.6 $\pm$ 0.9
Chesterfield	25	ks (85 mm), sp, f	16.4 $\pm$ 0.4	0.93 $\pm$ 0.02	14.5 $\pm$ 0.6
Chesterfield	26	el (101 mm), sp, f	16.8 $\pm$ 0.3	1.00 $\pm$ 0.03	18.5 $\pm$ 0.7
Decade	28	ks (85 mm), sp, f, m	4.4 $\pm$ 0.6	0.38 $\pm$ 0.02	2.4 $\pm$ 0.4
Doral	31	ks (85 mm), sp, f	11.2 $\pm$ 0.4	0.80 $\pm$ 0.03	10.2 $\pm$ 0.4
Doral	32	ks (85 mm), sp, f, m	14.5 $\pm$ 0.2	0.78 $\pm$ 0.02	14.0 $\pm$ 0.8
DuMarquier	33	ks (85 mm), hp, f	16.6 $\pm$ 0.2	1.11 $\pm$ 0.05	21.7 $\pm$ 0.4
English Ovals	35	ks (85 mm), hp, nf	28.9 $\pm$ 0.6	1.74 $\pm$ 0.02	14.0 $\pm$ 0.2

Table 2 (Cont'd)

Brand	ORNL/FTC Number	Description	Deliveries, Mean (mg) $\pm$ Standard Deviation (mg)		
			Tar mg	Nicotine mg	CO mg
<i>Eve</i>	36	el (100 mm), sp, f	15.8 $\pm$ 0.5	1.08 $\pm$ 0.04	18.0 $\pm$ 0.6
<i>Eve</i>	37	3l (100 mm), sp, f, m	18.0 $\pm$ 0.6	0.97 $\pm$ 0.02	19.4 $\pm$ 0.4
<i>Iceberg 100's</i>	46	3l (100 mm), sp, f, m	2.1 $\pm$ 0.1	0.24 $\pm$ 0.01	3.7 $\pm$ 0.2
<i>Kent</i>	47	ks (80 mm), hp, f	17.7 $\pm$ 0.2	1.00 $\pm$ 0.02	20.3 $\pm$ 0.3
<i>Kent Golden Lights</i>	49	ks (85 mm), sp, f	9.9 $\pm$ 0.3	0.66 $\pm$ 0.03	11.7 $\pm$ 0.2
<i>Kent Golden Lights</i>	50	ks (85 mm), sp, f, m	9.3 $\pm$ 0.2	0.76 $\pm$ 0.03	11.9 $\pm$ 0.2
<i>Kent Micronite II</i>	51	el (100 mm), sp, f	15.3 $\pm$ 0.1	1.02 $\pm$ 0.02	17.5 $\pm$ 0.4
<i>Kent Golden Lights</i>	52	el (100 mm), sp, f	12.5 $\pm$ 0.7	0.83 $\pm$ 0.02	13.2 $\pm$ 0.5
<i>Kent</i>	53	el (100 mm), sp, f, m	19.5 $\pm$ 1.0	1.13 $\pm$ 0.02	19.6 $\pm$ 0.9
<i>Kent Golden Lights</i>	54	el (100 mm), sp, f, m	10.5 $\pm$ 0.1	0.66 $\pm$ 0.03	11.2 $\pm$ 0.3
<i>Kool</i>	56	ks (80 mm), hp, f, m	18.0 $\pm$ 0.7	1.18 $\pm$ 0.03	18.4 $\pm$ 0.2
<i>Kool Milds</i>	58	ks (85 mm), sp, f, m	14.4 $\pm$ 0.5	0.95 $\pm$ 0.10	19.4 $\pm$ 0.3
<i>Kool Super Lights</i>	59	ks (85 mm), sp, f, m	10.2 $\pm$ 0.4	0.74 $\pm$ 0.03	13.0 $\pm$ 0.6
<i>Kool</i>	60	el (100 mm), sp, f, m	14.5 $\pm$ 0.1	1.07 $\pm$ 0.02	15.3 $\pm$ 0.3
<i>Kool Super Lights</i>	61	3l (100 mm), sp, f, m	10.3 $\pm$ 0.1	0.74 $\pm$ 0.01	12.7 $\pm$ 0.5
<i>LSM</i>	62	ks (80 mm), hp, f	20.8 $\pm$ 0.2	1.05 $\pm$ 0.04	19.8 $\pm$ 0.3
<i>LSM</i>	63	ks (85 mm), sp, f	17.6 $\pm$ 1.6	0.89 $\pm$ 0.03	17.7 $\pm$ 0.8
<i>LSM Lights</i>	64	ks (85 mm), sp, f	9.0 $\pm$ 0.3	0.68 $\pm$ 0.02	5.7 $\pm$ 0.2
<i>LSM Lights</i>	66	el (100 mm), sp, f	8.1 $\pm$ 0.3	0.66 $\pm$ 0.02	5.6 $\pm$ 0.3
<i>LSM</i>	67	el (100 mm), sp, f, m	18.9 $\pm$ 0.6	1.06 $\pm$ 0.02	21.5 $\pm$ 0.5
<i>Lark</i>	68	ks (85 mm), sp, f	18.6 $\pm$ 0.2	1.14 $\pm$ 0.02	20.6 $\pm$ 0.9
<i>Lark II</i>	69	ks (85 mm), sp, f	7.8 $\pm$ 0.8	0.68 $\pm$ 0.05	8.7 $\pm$ 0.4
<i>Lark</i>	70	el (100 mm), sp, f	19.5 $\pm$ 0.2	1.04 $\pm$ 0.05	21.2 $\pm$ 0.5
<i>Lucky Strike</i>	73	rs (70 mm), sp, nf	26.9 $\pm$ 1.3	1.46 $\pm$ 0.06	16.1 $\pm$ 0.8
<i>Lucky Ten</i>	74	ks (85 mm), sp, f	9.6 $\pm$ 0.4	0.72 $\pm$ 0.03	11.6 $\pm$ 0.3
<i>Marlboro</i>	78	ks (80 mm), hp, f	19.0 $\pm$ 0.3	1.04 $\pm$ 0.02	14.8 $\pm$ 0.2
<i>Marlboro</i>	79	ks (80 mm), hp, f, m	14.3 $\pm$ 0.4	0.87 $\pm$ 0.02	13.5 $\pm$ 0.3
<i>Marlboro</i>	80	ks (85 mm), sp, f	18.3 $\pm$ 1.4	0.93 $\pm$ 0.03	20.9 $\pm$ 0.8
<i>Marlboro Lights</i>	81	ks (85 mm), sp, f	14.0 $\pm$ 0.1	0.81 $\pm$ 0.01	15.1 $\pm$ 0.9
<i>Marlboro</i>	83	el (100 mm), hp, f	19.2 $\pm$ 0.4	1.00 $\pm$ 0.03	20.2 $\pm$ 0.5
<i>Marlboro</i>	84	el (100 mm), sp, f	19.2 $\pm$ 0.9	0.90 $\pm$ 0.02	17.1 $\pm$ 0.5
<i>Marlboro Lights</i>	85	el (100 mm), sp, f	12.1 $\pm$ 0.6	0.76 $\pm$ 0.02	14.4 $\pm$ 0.6

Table 2 (cont'd)

Brand	ORNL/FTC Number	Description	Deliveries, Mean (mg) $\pm$ Standard Deviation (mg)		
			Tar mg	Nicotine mg	CO mg
<i>Max</i>	86	el (120 mm), sp, f	18.8 $\pm$ 1.3	1.08 $\pm$ 0.03	16.3 $\pm$ 1.0
<i>Max</i>	87	el (120 mm), sp, f, m	21.0 $\pm$ 1.0	1.31 $\pm$ 0.02	22.9 $\pm$ 1.1
<i>Merit</i>	88	ks (85 mm), sp, f	9.1 $\pm$ 0.2	0.62 $\pm$ 0.02	11.0 $\pm$ 0.5
<i>Merit</i>	89	ks (85 mm), sp, f, m	8.4 $\pm$ 0.2	0.67 $\pm$ 0.02	10.1 $\pm$ 0.5
<i>Merit 100's</i>	90	el (100 mm), sp, f	12.4 $\pm$ 0.3	0.87 $\pm$ 0.02	13.1 $\pm$ 0.9
<i>Merit 100's</i>	91	el (100 mm), sp, f, m	10.6 $\pm$ 0.6	0.75 $\pm$ 0.02	11.7 $\pm$ 0.4
<i>More</i>	93	el (120 mm), sp, f	25.6 $\pm$ 0.3	1.91 $\pm$ 0.03	25.7 $\pm$ 0.9
<i>More</i>	94	el (120 mm), sp, f, m	24.8 $\pm$ 1.7	1.71 $\pm$ 0.03	25.7 $\pm$ 1.7
<i>Multifilter</i>	95	ks (85 mm), sp, f	14.4 $\pm$ 0.1	0.84 $\pm$ 0.03	14.0 $\pm$ 0.4
<i>Newport</i>	97	ks (80 mm), hp, f, m	20.1 $\pm$ 0.6	1.03 $\pm$ 0.02	20.3 $\pm$ 0.8
<i>Newport Lights</i>	99	ks (85 mm), sp, f, m	12.9 $\pm$ 0.3	0.82 $\pm$ 0.04	14.4 $\pm$ 0.3
<i>Newport</i>	100	el (100 mm), sp, f, m	23.4 $\pm$ 0.2	1.37 $\pm$ 0.03	19.1 $\pm$ 0.4
<i>Now</i>	101	ks (80 mm), hp, f	1.7 $\pm$ 0.1	0.16 $\pm$ 0.01	2.5 $\pm$ 0.1
<i>Now</i>	102	ks (85 mm), hp, f, m	2.2 $\pm$ 0.1	0.16 $\pm$ 0.01	2.4 $\pm$ 0.3
<i>Now</i>	103	ks (85 mm), sp, f	1.9 $\pm$ 0.1	0.16 $\pm$ 0.01	2.4 $\pm$ 0.1
<i>Old Gold Filters</i>	107	ks (85 mm), sp, f	17.5 $\pm$ 1.0	0.95 $\pm$ 0.03	15.8 $\pm$ 0.6
<i>Old Gold Lights</i>	108	ks (85 mm), sp, f	16.3 $\pm$ 0.9	0.91 $\pm$ 0.02	13.4 $\pm$ 0.5
<i>Old Gold 100's</i>	109	el (100 mm), sp, f	21.8 $\pm$ 0.8	1.47 $\pm$ 0.14	20.6 $\pm$ 0.7
<i>Pall Mall</i>	110	ks (85 mm), sp, nf	28.2 $\pm$ 0.4	1.66 $\pm$ 0.05	17.1 $\pm$ 0.5
<i>Pall Mall Extra Light</i>	112	ks (85 mm), sp, f	5.7 $\pm$ 0.4	0.51 $\pm$ 0.01	6.3 $\pm$ 0.2
<i>Pall Mall</i>	113	el (100 mm), sp, f	19.3 $\pm$ 0.5	1.37 $\pm$ 0.03	18.5 $\pm$ 0.7
<i>Parliament</i>	115	ks (80 mm), hp, f	10.0 $\pm$ 0.4	0.62 $\pm$ 0.03	12.0 $\pm$ 0.3
<i>Parliament</i>	116	ks (85 mm), sp, f	10.4 $\pm$ 0.1	0.64 $\pm$ 0.02	12.3 $\pm$ 0.3
<i>Parliament 100's</i>	117	el (100 mm), sp, f	13.0 $\pm$ 0.7	0.82 $\pm$ 0.02	12.6 $\pm$ 0.4
<i>Philip Morris</i>	118	rs (70 mm), sp, nf	21.4 $\pm$ 0.3	1.12 $\pm$ 0.05	11.8 $\pm$ 0.5
<i>Philip Morris Commander</i>	119	ks (85 mm), sp, nf	26.8 $\pm$ 1.2	1.55 $\pm$ 0.15	17.0 $\pm$ 0.3
<i>Picayne</i>	122	rs (70 mm), sp, nf	23.0 $\pm$ 2.2	1.21 $\pm$ 0.10	17.8 $\pm$ 1.1

Table 2 (Cont'd)

Brand	ORNL/FTC Number	Description	Deliveries, Mean (mg) $\pm$ Standard Deviation (mg)		
			Tar mg	Nicotine mg	CO mg
<i>Players</i>	124	rs (70 mm), hp, nf	26.8 $\pm$ 1.1	1.79 $\pm$ 0.05	14.7 $\pm$ 0.9
<i>Raleigh</i>	125	ks (85 mm), sp, nf	24.2 $\pm$ 0.6	1.25 $\pm$ 0.06	16.6 $\pm$ 0.6
<i>Raleigh</i>	126	ks (85 mm), sp, f	17.7 $\pm$ 0.7	1.06 $\pm$ 0.04	18.4 $\pm$ 0.8
<i>Raleigh Lights*-FTC</i>	127	ks (85 mm), sp, f, w/adh	11.0 $\pm$ 0.2	0.87 $\pm$ 0.05	14.3 $\pm$ 0.1
<i>Raleigh Lights*-FTC</i>	127	ks (85 mm), sp, f, w/o adh	13.5 $\pm$ 0.9	0.91 $\pm$ 0.08	15.4 $\pm$ 0.1
<i>Raleigh</i>	128	el (100 mm), sp, f	17.2 $\pm$ 1.2	1.02 $\pm$ 0.02	20.0 $\pm$ 0.7
<i>Real</i>	129	ks (85 mm), sp, f	9.0 $\pm$ 0.6	0.72 $\pm$ 0.03	9.5 $\pm$ 0.3
<i>Real</i>	130	ks (85 mm), sp, f, m	9.6 $\pm$ 0.2	0.74 $\pm$ 0.01	9.1 $\pm$ 0.3
<i>Salem</i>	133	ks (80 mm), hp, f, m	17.2 $\pm$ 1.0	1.15 $\pm$ 0.03	19.8 $\pm$ 0.4
<i>Salem</i>	134	ks (85 mm), sp, f, m	17.2 $\pm$ 0.1	1.12 $\pm$ 0.03	19.5 $\pm$ 0.4
<i>Salem Lights</i>	135	ks (85 mm), sp, f, m	11.3 $\pm$ 0.2	0.79 $\pm$ 0.02	15.8 $\pm$ 0.6
<i>Salem</i>	136	el (100 mm), sp, f, m	20.3 $\pm$ 0.5	1.36 $\pm$ 0.10	22.7 $\pm$ 0.8
<i>Salem Long Lights</i>	137	el (100 mm), sp, f, m	12.4 $\pm$ 1.9	0.94 $\pm$ 0.08	16.2 $\pm$ 0.3
<i>Saratoga</i>	138	el (120 mm), hp, f	18.8 $\pm$ 1.4	1.09 $\pm$ 0.04	19.4 $\pm$ 0.7
<i>Saratoga</i>	139	el (120 mm), hp, f, m	19.9 $\pm$ 1.3	1.16 $\pm$ 0.05	25.2 $\pm$ 0.7
<i>Silva Thins*-FTC</i>	140	el (120 mm), sp, f, w/adh	13.1 $\pm$ 0.7	0.86 $\pm$ 0.01	11.8 $\pm$ 0.6
<i>Silva Thins*-Knoxville, TN</i>	140	el (120 mm), sp, f, w/adh	13.8 $\pm$ 0.9	1.01 $\pm$ 0.04	12.3 $\pm$ 0.4
<i>Silva Thins*-FTC</i>	140	el (120 mm), sp, f, w/o adh	17.1 $\pm$ 1.2	1.03 $\pm$ 0.07	13.8 $\pm$ 0.1
<i>Spring 100's</i>	142	el (100 mm), sp, f, m	20.1 $\pm$ 0.1	1.08 $\pm$ 0.02	17.9 $\pm$ 0.2
<i>Tareyton</i>	147	ks (85 mm), sp, f	18.7 $\pm$ 0.1	1.12 $\pm$ 0.2	13.7 $\pm$ 0.3
<i>Tareyton Lights</i>	148	ks (85 mm), sp, f	6.3 $\pm$ 0.2	0.56 $\pm$ 0.02	8.6 $\pm$ 0.5
<i>Tareyton Low-Tar</i>	149	ks (85 mm), sp, f, m	7.2 $\pm$ 0.1	0.57 $\pm$ 0.01	13.1 $\pm$ 1.4
<i>Tareyton Long Lights</i>	151	el (100 mm), sp, f	10.6 $\pm$ 0.4	0.73 $\pm$ 0.02	13.4 $\pm$ 0.5
<i>True Blue 5's</i>	153	ks (85 mm), sp, f	5.9 $\pm$ 0.1	0.46 $\pm$ 0.08	6.9 $\pm$ 0.3
<i>True Green 5's</i>	154	ks (85 mm), sp, f, m	4.5 $\pm$ 0.3	0.33 $\pm$ 0.04	4.4 $\pm$ 0.2
<i>True 100's</i>	155	el (100 mm), sp, f	15.2 $\pm$ 0.1	0.87 $\pm$ 0.01	18.1 $\pm$ 0.8
<i>True 100's</i>	156	el (100 mm), sp, f, m	16.6 $\pm$ 0.9	0.83 $\pm$ 0.03	19.2 $\pm$ 0.1



Table 2 (Cont'd)

Brand	ORNL/FTC Number	Description	Deliveries, Mean (mg) $\pm$ Standard Deviation (mg)		
			Tar mg	Nicotine mg	CO mg
<i>Twist</i>	157	el (100 mm), sp, f, 1/m	14.6 $\pm$ 1.0	1.01 $\pm$ 0.02	17.0 $\pm$ 0.5
<i>Vantage</i>	158	ks (85 mm), sp, f	10.7 $\pm$ 0.2	0.75 $\pm$ 0.02	15.3 $\pm$ 0.3
<i>Vantage</i>	159	ks (85 mm), sp, f, m	10.8 $\pm$ 0.2	0.81 $\pm$ 0.02	16.8 $\pm$ 0.2
<i>Vantage</i>	160	el (100 mm), sp, f	13.4 $\pm$ 0.8	0.81 $\pm$ 0.02	17.2 $\pm$ 0.8
<i>Viceroy</i>	161	ks (85 mm), sp, f	15.2 $\pm$ 0.3	1.08 $\pm$ 0.03	19.8 $\pm$ 0.4
<i>Viceroy Lights</i>	162	ks (85 mm), sp, f	14.0 $\pm$ 0.1	0.98 $\pm$ 0.02	15.9 $\pm$ 0.4
<i>Viceroy</i>	163	el (100 mm), sp, f	16.4 $\pm$ 0.1	1.10 $\pm$ 0.02	18.6 $\pm$ 0.2
<i>Virginia Slims</i>	164	el (100 mm), sp, f	17.5 $\pm$ 0.9	0.82 $\pm$ 0.04	16.9 $\pm$ 1.0
<i>Winston</i>	166	ks (80 mm), hp, f	20.0 $\pm$ 2.7	1.20 $\pm$ 0.03	15.1 $\pm$ 0.8
<i>Winston</i>	167	ks (85 mm), sp, f	20.8 $\pm$ 0.9	1.55 $\pm$ 0.13	19.7 $\pm$ 0.5
<i>Winston Lights</i>	168	ks (85 mm), sp, f	14.0 $\pm$ 0.4	0.82 $\pm$ 0.01	15.0 $\pm$ 0.5
<i>Winston 100's</i>	169	el (100 mm), sp, f	20.7 $\pm$ 0.5	1.23 $\pm$ 0.03	19.0 $\pm$ 0.5
<i>Winston Lights 100's</i>	170	el (100 mm), sp, f	15.0 $\pm$ 0.2	1.02 $\pm$ 0.02	16.6 $\pm$ 0.6
<i>Winston</i>	171	el (100 mm), sp, f, m	19.8 $\pm$ 0.4	1.13 $\pm$ 0.02	17.7 $\pm$ 0.5

\*Two types of filters were found in samples of Raleigh Lights and Silva Thins. Some filters possessed air dilution holes, some did not. Samples of these brands were segregated according to filter type and smoked separately. See Text.

el = extra long

f = filter

hp = hard pack

ks = king size

m = menthol

nf = nonfilter

rs = regular size

sp = soft pack

w/adh = with air dilution holes

w/o adh = without air dilution holes

Table 3

Tar, Nicotine, and Carbon Monoxide Deliveries  
of Selected U.S. Commercial Cigarettes  
RESULTS PER PUFF

Brand	ORNL/FTC Number	Description	Deliveries, (mg) Per Puff		
			Tar mg	Nicotine mg	CO mg
<i>Belair</i>	4	king size (85 mm), soft pack, filter, menthol	1.7	0.12	2.1
<i>Belair</i>	5	extra long (100 mm), soft pack, filter, menthol	1.53	0.095	1.67
<i>Benson &amp; Hedges</i>	6	regular size (70 mm), hard pack, filter	0.15	0.015	0.17
<i>Benson &amp; Hedges 100's</i>	8	extra long (100 mm), hard pack, filter	2.1	0.11	2.5
<i>Benson &amp; Hedges 100's</i>	9	extra long (100 mm), hard pack, filter, menthol	1.9	0.11	2.1
<i>Benson &amp; Hedges 100's</i>	10	extra long (100 mm), soft pack, filter	2.1	0.12	2.2
<i>Benson &amp; Hedges Lights</i>	12	extra long (100 mm), soft pack, filter	1.2	0.079	1.3
<i>Benson &amp; Hedges Lights</i>	13	extra long (100 mm), soft pack, filter, menthol	1.3	0.080	0.92
<i>Bull Durham</i>	14	king size (85 mm), soft pack, filter	3.09	0.171	2.49
<i>Camel</i>	15	regular size (70 mm), soft pack, non-filter	3.7	0.22	2.3
<i>Camel</i>	16	king size (85 mm), soft pack, filter	2.6	0.15	2.3
<i>Camel Lights</i>	17	king size (85 mm), soft pack, filter	1.2	0.10	1.6
<i>Carlton</i>	19	king size (85 mm), soft pack, filter	0.14	0.017	0.30
<i>Carlton</i>	20	king size (85 mm), soft pack, filter, menthol	0.07	0.010	0.16
<i>Carlton 100's</i>	22	extra long (100 mm), soft pack, filter, menthol	0.48	0.043	0.56
<i>Chesterfield</i>	23	regular size (70 mm), soft pack, non-filter	3.1	0.17	1.9
<i>Chesterfield</i>	24	king size (85 mm), soft pack, non-filter	3.1	0.13	1.8
<i>Chesterfield</i>	25	king size (85 mm), soft pack, filter	2.0	0.11	1.8
<i>Chesterfield</i>	26	extra long (101 mm), soft pack, filter	1.8	0.11	2.0
<i>Decade</i>	28	king size (85 mm), soft pack, filter, menthol	0.53	0.046	0.29
<i>Doral</i>	31	king size (85 mm), soft pack, filter	1.2	0.085	1.1
<i>Doral</i>	32	king size (85 mm), soft pack, filter, menthol	1.7	0.092	1.6
<i>Durham</i>	33	king size (85 mm), hard pack, filter	1.9	0.13	2.5
<i>English Oaks</i>	35	king size (85 mm), hard pack, non-filter	2.9	0.18	1.4

Table 3 (Cont'd)

Brand	ORNL/FTC Number	Description	Deliveries, (mg) Per Puff		
			Tar mg	Nicotine mg	CO mg
<i>5ve</i>	36	extra long (100 mm), soft pack, filter	1.9	0.13	2.1
<i>Eve</i>	37	extra long (100 mm), soft pack, filter, menthol	2.0	0.11	2.2
<i>Iceberg 100's</i>	46	extra long (100 mm), soft pack, filter, menthol	0.24	0.028	0.43
<i>Kent</i>	47	king size (80 mm), hard pack, filter	2.2	0.13	2.6
<i>Kent Golden Lights</i>	49	king size (85 mm), soft pack, filter	1.3	0.089	1.6
<i>Kent Golden Lights</i>	50	king size (85 mm), soft pack, filter, menthol	1.1	0.088	1.4
<i>Kent Micronite II</i>	51	extra long (100 mm), soft pack, filter	1.6	0.11	1.9
<i>Kent Golden Lights</i>	52	extra long (100 mm), soft pack, filter	1.5	0.098	1.6
<i>Kent</i>	53	extra long (100 mm), soft pack, filter, menthol	2.3	0.13	2.3
<i>Kent Golden Lights</i>	54	extra long (100 mm), soft pack, filter, menthol	1.1	0.072	1.2
<i>Kool</i>	56	king size (80 mm), hard pack, filter, menthol	2.2	0.15	2.3
<i>Kool Milds</i>	58	king size (85 mm), soft pack, filter, menthol	1.8	0.12	2.4
<i>Kool Super Lights</i>	59	king size (85 mm), soft pack, filter, menthol	1.2	0.086	1.5
<i>Kool</i>	60	extra long (100 mm), soft pack, filter, menthol	1.38	0.102	1.46
<i>Kool Super Lights</i>	61	extra long (100 mm), soft pack, filter, menthol	1.1	0.076	1.3
<i>LSM</i>	62	king size (80 mm), hard pack, filter	2.6	0.13	2.4
<i>LSM</i>	63	king size (85 mm), soft pack, filter	2.2	0.11	2.2
<i>LSM Lights</i>	64	king size (85 mm), soft pack, filter	1.1	0.081	0.68
<i>LSM Lights</i>	66	extra long (100 mm), soft pack, filter	0.90	0.073	0.62
<i>LSM</i>	67	extra long (100 mm), soft pack, filter, menthol	1.9	0.11	2.2
<i>Lark</i>	68	king size (85 mm), soft pack, filter	2.1	0.13	2.3
<i>Lark II</i>	69	king size (85 mm), soft pack, filter	1.1	0.092	1.2
<i>Lark</i>	70	extra long (100 mm), soft pack, filter	2.0	0.11	2.2
<i>Lucky Strike</i>	73	regular size (70 mm), soft pack, non-filter	3.4	0.18	2.0
<i>Lucky Ten</i>	74	king size (85 mm), soft pack, filter	1.2	0.090	1.4
<i>Marlboro</i>	78	king size (80 mm), hard pack, filter	2.3	0.13	1.8
<i>Marlboro</i>	79	king size (80 mm), hard pack, filter, menthol	1.8	0.11	1.7
<i>Marlboro</i>	80	king size (85 mm), soft pack, filter	2.1	0.11	2.4
<i>Marlboro Lights</i>	81	king size (85 mm), soft pack, filter	1.8	0.10	1.9
<i>Marlboro</i>	83	extra long (100 mm), hard pack, filter	2.1	0.11	2.2
<i>Marlboro</i>	84	extra long (100 mm), soft pack, filter	2.0	0.092	1.7
<i>Marlboro Lights</i>	85	extra long (100 mm), soft pack, filter	1.2	0.077	1.4

Table 3 (Cont'd)

Brand	ORNL/FTC Number	Description	Deliveries, (mg) Per Puff		
			Tar mg	Nicotine mg	CO mg
<i>Maz</i>	86	extra long (120 mm), soft pack, filter	1.76	0.101	1.52
<i>Maz</i>	87	extra long (120 mm), soft pack, filter, menthol	1.89	0.118	2.06
<i>Merit</i>	88	king size (85 mm), soft pack, filter	1.1	0.075	1.3
<i>Merit</i>	89	king size (85 mm), soft pack, filter, menthol	1.0	0.083	1.2
<i>Merit 100's</i>	90	extra long (100 mm), soft pack, filter	1.24	0.087	1.31
<i>Merit 100's</i>	91	extra long (100 mm), soft pack, filter, menthol	1.2	0.082	1.3
<i>More</i>	93	extra long (120 mm), soft pack, filter	1.64	0.122	1.65
<i>More</i>	94	extra long (120 mm), soft pack, filter, menthol	1.52	0.105	1.58
<i>Multiplier</i>	95	king size (85 mm), soft pack, filter	1.9	0.11	1.8
<i>Newport</i>	97	king size (80 mm), hard pack, filter, menthol	2.5	0.13	2.5
<i>Newport Lights</i>	99	king size (85 mm), soft pack, filter, menthol	1.5	0.095	1.7
<i>Newport</i>	100	extra long (100 mm), soft pack, filter, menthol	2.4	0.14	2.0
<i>Now</i>	101	king size (85 mm), hard pack, filter	0.23	0.022	0.34
<i>Now</i>	102	king size (85 mm), hard pack, filter, menthol	0.31	0.023	0.34
<i>Now</i>	103	king size (85 mm), soft pack, filter	0.24	0.021	0.31
<i>Old Gold Filters</i>	107	king size (85 mm), soft pack, filter	2.3	0.12	2.1
<i>Old Gold Lights</i>	108	king size (85 mm), soft pack, filter	1.9	0.11	1.6
<i>Old Gold 100's</i>	109	extra long (100 mm), soft pack, filter	2.3	0.15	2.1
<i>Full Mall</i>	110	king size (85 mm), soft pack, non-filter	2.74	0.161	1.66
<i>Full Mall Extra Light</i>	112	king size (85 mm), soft pack, filter	0.65	0.058	0.72
<i>Full Mall</i>	113	extra long (100 mm), soft pack, filter	1.91	0.136	1.83
<i>Parliament</i>	115	king size (80 mm), hard pack, filter	1.4	0.085	1.6
<i>Parliament</i>	116	king size (85 mm), soft pack, filter	1.4	0.083	1.6
<i>Parliament 100's</i>	117	extra long (100 mm), soft pack, filter	1.30	0.082	1.26
<i>Philip Morris</i>	118	regular size (70 mm), soft pack, non-filter	3.0	0.16	1.6
<i>Philip Morris Commander</i>	119	king size (85 mm), soft pack, non-filter	2.9	0.17	1.8
<i>Picayne</i>	122	regular size (70 mm), soft pack, non-filter	3.2	0.17	2.5

Table 3 (Cont'd)

Brand	ORNL/FTC Number	Description	Deliveries, (mg) Per Puff <sup>a</sup>		
			Tar mg	Nicotine mg	CO mg
<i>Players</i>	124	regular size (70 mm), hard pack, non-filter	3.4	0.22	1.8
<i>Raleigh</i>	125	king size (85 mm), soft pack, non-filter	2.5	0.13	1.7
<i>Raleigh</i>	126	king size (85 mm), soft pack, filter	2.1	0.12	2.1
<i>Raleigh Lights*-FTC</i>	127	king size (85 mm), soft pack, filter, w/air dilution holes	1.3	0.10	1.7
<i>Raleigh Lights*-FTC</i>	127	king size (85 mm), soft pack, filter, w/o air dilution holes	1.6	0.11	1.8
<i>Raleigh</i>	128	extra long (100 mm), soft pack, filter	1.7	0.10	2.0
<i>Real</i>	129	king size (85 mm), soft pack, filter	1.1	0.090	1.2
<i>Real</i>	130	king size (85 mm), soft pack, filter, menthol	1.2	0.092	1.1
<i>Salem</i>	133	king size (80 mm), hard pack, filter, menthol	1.9	0.13	2.2
<i>Salem</i>	134	king size (85 mm), soft pack, filter, menthol	1.9	0.13	2.2
<i>Salem Lights</i>	135	king size (85 mm), soft pack, filter, menthol	1.3	0.094	1.9
<i>Salem</i>	136	extra long (100 mm), soft pack, filter, menthol	1.99	0.133	2.22
<i>Salem Long Lights</i>	137	extra long (100 mm), soft pack, filter, menthol	1.13	0.085	1.47
<i>Saratoga</i>	138	extra long (120 mm), hard pack, filter	1.59	0.0924	1.64
<i>Saratoga</i>	139	extra long (120 mm), hard pack, filter, menthol	1.78	0.104	2.25
<i>Silva Thins*-FTC</i>	140	extra long (120 mm), soft pack, filter, w/air dilution holes	1.4	0.093	1.3
<i>Silva Thins*-Knoxville, TN</i>	140	extra long (120 mm), soft pack, filter, w/air dilution holes	1.5	0.11	1.4
<i>Silva Thins*-FTC</i>	140	extra long (120 mm), soft pack, filter, w/o air dilution holes	1.9	0.12	1.6
<i>Spring 100's</i>	142	extra long (100 mm), soft pack, filter, menthol	2.2	0.12	2.0
<i>Tareyton</i>	147	king size (85 mm), soft pack, filter	2.0	0.12	1.5
<i>Tareyton Lights</i>	148	king size (85 mm), soft pack, filter	0.72	0.064	0.98
<i>Tareyton Low-Tar</i>	149	king size (85 mm), soft pack, filter, menthol	0.89	0.070	1.6
<i>Tareyton Long Lights</i>	151	extra long (100 mm), soft pack, filter	1.06	0.073	1.34
<i>True Blue 5's</i>	153	king size (85 mm), soft pack, filter	0.86	0.067	1.0
<i>True Green 5's</i>	154	king size (85 mm), soft pack, filter, menthol	0.60	0.044	0.59
<i>True 100's</i>	155	extra long (100 mm), soft pack, filter	1.39	0.080	1.66
<i>True 100's</i>	156	extra long (100 mm), soft pack, filter, menthol	1.7	0.085	2.0